Record and Retrieval Phase 1 Thread

Assessment

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Version 2.0

Record and Retrieval Phase 1
Table of Contents

Assessment Team

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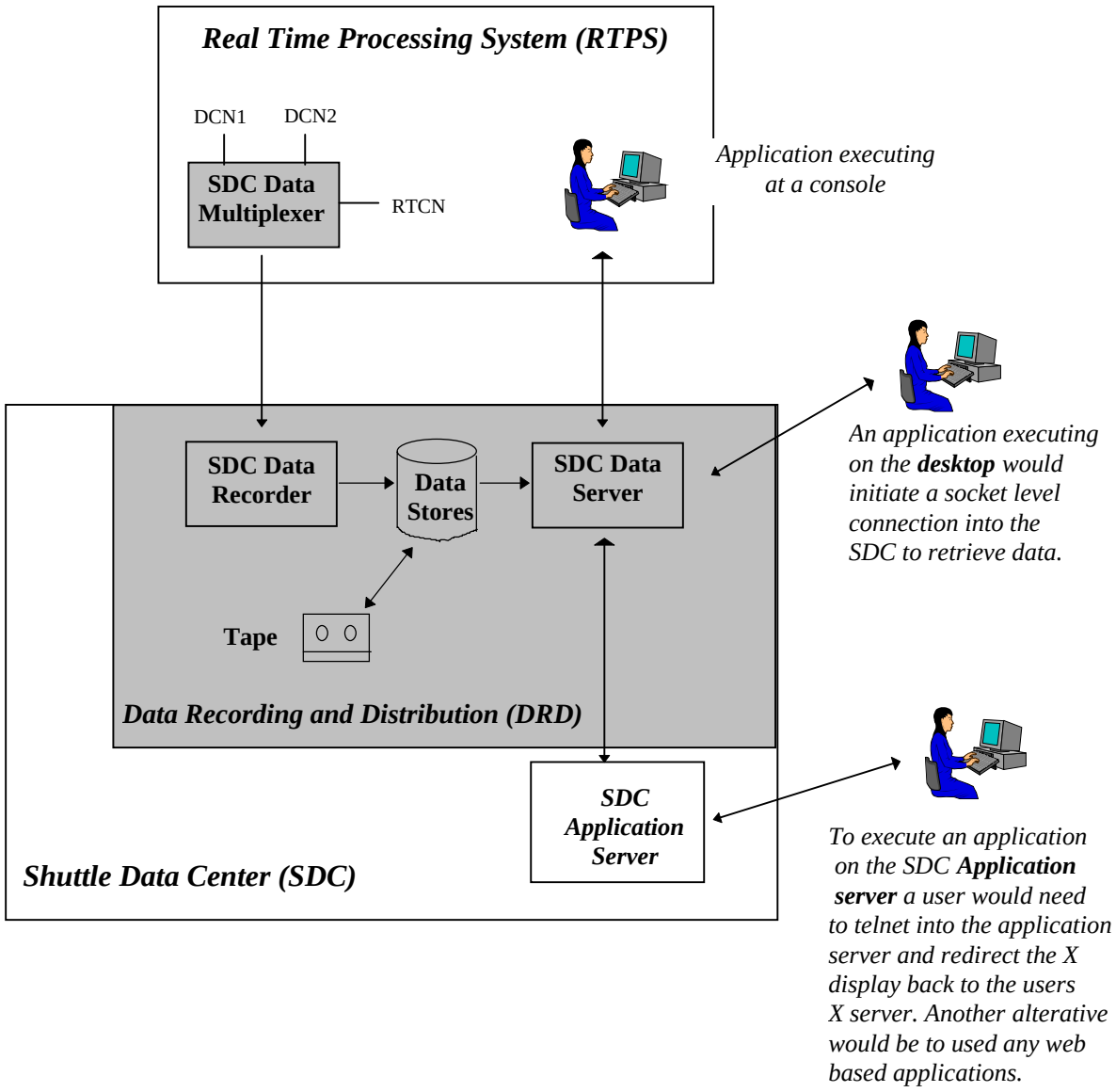
1. Introduction

1.1 Record and Retrieval Phase 1 Overview.

This thread establishes the frame work for CLCS data recording, archival and retrieval services, and to begin the migration of the recording function from the CCMS PDR/SPA and CDS/Shuttle Data Center to the CLCS system.

1.2 Record and Retrieval Phase 1 Concept

The Record and Retrieve Services Phase 1 Thread provides the capability to record RTPS change data and message data in the Data Recording and Distribution (DRD) subsystem of the Shuttle Data Center (SDC). It also provides retrieval services in the form of SDC Retrieval APIs. The following diagram depicts the relationship between the SDC, DRD, RTPS and the applications using the DRD as a data source. The shaded areas indicate the areas this thread address.



1.3 Record and Retrieval Phase 1 Specification

1.3.1 Statement of Work

- Investigate and define what data are recorded in CLCS. Including system messages, commands, data distribution, and inter application communication.
- Investigate and define where and when data are recorded.
- Investigate and define long range plan for data retrieval.
- Provide Index recording of FD data in the CLCS format on the Shuttle Data Center system.
- Provide Index retrieval service to return FD data in a format usable by DAP programs.
- Provide initial capability to retrieve CLCS FD's and provide the addition health and time information.
- Provide initial capability to retrieve for a CLCS FD's the Reason Code information for FD's with health bits set
- Provide the capability to record all CLCS supported commands.
- Provide the capability to retrieve all CLCS supported commands.
- Provide the capability to filter retrieval of CLCS supported commands by source, destination, type, and time.
- Provide the capability to record all CLCS supported System Messages.
- Provide the capability to retrieve all CLCS supported System Messages.
- Provide the capability to filter retrieval of CLCS supported System Messages by source, destination, type, and time.
- Provide the capability to record all CLCS packets.
- Provide the capability to retrieve all CLCS packets.
- Provide the capability to filter retrieve of CLCS supported packets by source, destination, type, and time.
- Provide the SDC multiplexer capability.

<Moved items dealing with raw packet retrieval application to the Support Advisory Thread >

1.3.2 Requirements

This section contains a list of SLS and high level derived requirements that are driving the design of the capability of the THOR release.

2.4.6 Recording Requirements

2.4.6.1 The SDC shall record data for all RTPS Test Sets.

2.4.6.2 The SDC shall record all data sent by any RTPS Test Set for recording..

2.4.6.7 The SDC shall provide the capability to record and catalog RTPS processed data.

2.4.6.8 The SDC shall provide the capability to record, catalog, and index RTPS measurement and command data.

2.4.7 Retrieving Requirements

2.4.7.2 The SDC shall provide the capability to retrieve recorded Measurement FD data in raw and formatted

formats, including interpreted ASCII data, where applicable.

2.4.7.3 The SDC shall provide a set of programs to retrieve each different kind of data sent from a RTPS set in raw and formatted formats, including interpreted ASCII data, where applicable.

2.4.7.4 The SDC shall provide the capability to retrieve LDB and GSE data in raw and formatted formats, including interpreted ASCII data, where applicable.

2.4.7.5 The SDC shall provide the capability to retrieve, correlate, index, analyze, and format processed data.

2.4.7.7 The SDC shall provide a capability to export data to users.

2.4.8 Archiving Requirements

2.4.8.1 Recorded data in the SDC shall be managed hierarchically.

1. The three levels shall be On-line, Near-line, and Off-line.

2. On-line data shall reside on system attached magnetic disk (or media of equivalent access speed).

3. Near-line data shall reside on optical or magnetic media accessible by an on-line robot.

4. Off-line data may require manual effort to be retrievable.

5. Migration of data among levels shall be managed by algorithms taking into account age, usage, criticality, and arbitrary assignment.

2.4.8.2 The SDC shall provide online storage for raw data for all current Shuttle Processing Flows.

2.4.8.4 The SDC shall provide online storage for command and measurement data for all terminal counts, engine hot firings and special tests, as identified.

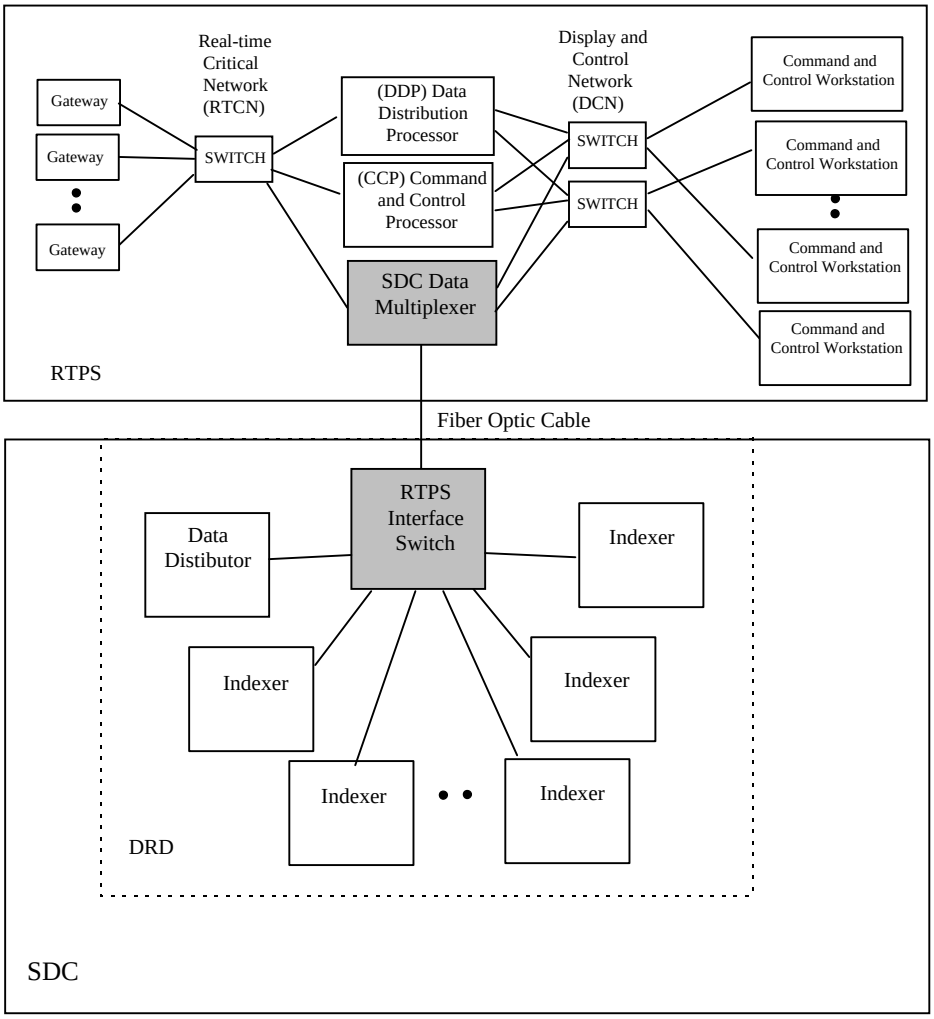
2.4.8.5 The SDC shall provide off-line storage for all recorded data.

2.4.8.6 The SDC shall provide the capability to restore off-line data.

1.4 Record and Retrieval Phase 1 Hardware Diagram

SDC Data Multiplexer

The SDC data multiplexer is a new concept being developed as the the recording interface between the RTPS and the SDC. The following diagram depicts the change to the existing SDC hardware configuration.



1.5 Record and Retrieval Phase 1 Deliverables

The following is a list of deliverable products for this thread:

Software Deliverables:

Deliverable	R&D Document	Code	API Manual	Users Guide
SDC Data Multiplexer Software	No	Yes	No	Yes
SDC Retrieval APIs	No	Yes	Yes	No

Hardware Deliverables:

None.

Other Deliverables:

Engineering Report to present the results of the following investigations:

1. What data is recorded in SDC.
2. Where and when data is recorded.
3. Define long range plan for data retrieval.

1.6 Record and Retrieval Phase 1 Assessment Summary

This is a summary of the manpower and labor costs to implement this thread.

1.6.1 Labor Assessments

The total Labor Costs required to provide this capability are summarized in the following table;

No.	CSCI/HWCI Name	Thor MM	Changes covered in
1	Recording, Archival and Retrieval	24.0 MM	N/A
	TOTAL	24.0 MM	N/A

1.6.2 Hardware Costs

The total Hardware Costs to implement the Thor requirements:

	Name	Unit Cost	Qty.	Total	Assumptions
1	Network Interface Card	TBD	TBD	TBD	New Buy
2	Switch	TBD	TBD	TBD	New Buy
3	UNIX Computer	TBD	6	TBD	New Buy
		Total:	TBD	**TBD**	

1.6.3 Record and Retrieval Phase 1 Procurement

The procurement schedule is as follows:

Procurement Activity	Completion Date

Procurement Activity	Completion Date
TBD	TBD

1.7 Record and Retrieval Phase 1 Schedule & Dependencies

1.7.1 Schedule

Task Name	Start	Finish
Thor Assessment Kickoff	7/23/97	7/23/97
Concept Panel Internal Review	9/2/97	9/2/97
Concept Panel	9/4/97	9/4/97
Thor Development		
Requirement Panel Internal Review	9/16/97	9/16/97
Requirement Panel	9/19/97	9/19/97
Design Panel Internal Review	9/30/97	9/30/97
Design Panel	10/2/97	10/2/97
CSCI Unit Testing	TBD	TBD
CSCI Development Integration Test	TBD	TBD
CSCI Formal Integration Test	TBD	TBD
Support System Integration Test	TBD	TBD
Thor Development Complete	3/27/97	3/27/97

1.7.2 Dependencies

- The reliable message interface modified for SDC must be available for use early in THOR (Used in the SDC data multiplexer).
- Need a data feed from the RTPS with data packets in the Thor format early in THOR.

1.8 Record and Retrieval Phase 1 Simulation Requirements

None.

1.9 Record and Retrieval Phase 1 Integration and System Test

TBD.

1.10 Record and Retrieval Phase 1 Training Requirements

1.10.1 Training Needed

None.

1.10.2 Training to be provided

None.

1.11 Record and Retrieval Phase 1 Facilities Requirements

- Com lines may have to be run from the various RTPS sets to support SDC recording.

1.12 Record and Retrieval Phase 1 Travel Requirements

None.

1.13 Record and Retrieval Phase 1 Action Items/Resolution

- Need to resolve what will be recorded. (IP and TCP/UDP headers).
- Need to resolve retrieval interface from the RTPS and the SDC. (DCN and/or BIN)
- Need to resolve how the Health and status of the SDC will be reported to the RTPS.
- Need to resolve how the SDC data multiplexer will be initialized by the RTPS (multicast address, etc)

2. CSCI Assessments

2.1 Recording, Archival and Retrieval CSCI Assessment

Recording, Archival and Retrieval CSCI Work Required

This is a list of work to be accomplished for Thor.

- Investigate and define what data are recorded in CLCS. Including system messages, commands, data distribution, and inter application communication.
- Investigate and define where and when data are recorded.
- Investigate and define long range plan for data retrieval.
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- Provide the capability to retrieve all CLCS supported System Messages.
- Provide the capability to filter retrieval of CLCS supported System Messages by source, destination, type, and time.
- Provide the capability to record all CLCS packets.
- Provide the capability to retrieve all CLCS packets.
- Provide the capability to filter retrieve of CLCS supported packets by source, destination, type, and time.

- Prototype SDC multiplexer.

<Moved items dealing with raw packet retrieval application to the Support Advisory Thread>

CSCI Assessment

CSC Name	CSC Labor (MM)	% of CSC
Recording, Archival and Retrieval	24.0 mm	40 %

Basis of estimate

The estimate is based on the size of the components in the LPS recording system in the SDC.

Lines of code:

SDC Mux	- 1000
Recorder	- 6000
Retriever	- 5000
Preprocessor	- 2000
AP File mods	- 500
APIs	- 500
Total	15000

Documentation

The Normal SDC development documentation will be produced as part of the Data Recording development.

Assumptions

- The SDC Lab (in the PCC) will be used to support the development of the RTPS data recording, archival and retrieval functions. These functions will be put under configuration control on serial zero.
- No applications will be written for this CSCI.
- The Reliable Messages Interface will be available with modifications to support SDC recording.
- A minimal operational interfaces will be developed.
- No heath and status reporting will be done.

Open Issues

- Retrievals from the DCN. This document does not address any extra hardware or software development effort needed.
- The interface to the RTPS (Fast Ether, FDDI, etc)
- Synchronization with the CDS replatform effort.
- Health and status reporting to the RTPS.
- Isolation requirements from the outside. (security)
- Do the ethernet headers, IP headers and TCP/UDP headers need to be recorded? If this is the case does all of the underlying protocol in TCP need to be recorded?
- The SDC data multiplexer has to be initialized by the RTPS and given the multicast address's to join.
- We need a reliable source of RTPS data early in THOR to facilitate development.

3. HWCI Assessments

None.

4. COTS Products Dependencies

4.1 SW Products Dependency List

None.

4.2 HW Products Dependency List

The following is a list of the COTS H/W needs for THOR.

Product Name	Quantity Needed	Need Date
Network Interface Cards	TBD	TBD
Switch	TBD	TBD
Unix Computer (SGI)	6	TBD